

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to the preparation of Individual Tooth Prostheses

1. ALFRED LANGENSCHEIDT, of 5 Grabenstrasse, Radevormwald/Rheinland, Germany, of German nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a device for use as a technical aid for preparing individual tooth prostheses.

In the production of individual tooth prostheses, such as jacket crowns, half crowns, inlays and the like, the known method comprises taking a copper collar or ring impression in the mouth of the patient over a prepared tooth stump and then taking a plaster impression of the whole jaw over the copper collar or ring while the latter is still in the mouth. The copper ring is filled with a special material such as a suitable silicone or alginate base which retains the shape of the patient's tooth stump in a negative sense.

By this procedure there is obtained a negative plaster impression of the patient's upper or lower teeth and gums in which is embedded the copper ring containing a negative impression of the tooth stump in the special material. A work model of the tooth stump is then made from the copper ring impression by filling it with modelling material and shaping a root-like extension of the same material extending outwards from the copper ring. With the common modelling materials such as amalgam, modelling cement or artificial resin, used for preparing the work model of the tooth stump, the copper ring impression has to be removed from the plaster impression in order to be filled with the aforementioned material, because filling in of the copper ring impression was only possible by hand in view of the shaping of the root-like extension of the modelling material which should extend from the copper ring by about 1.5 cm. This extension was shaped to have flat inclined sides, the faces being irregular. Upon re-inserting into the plaster impression, difficulties were often encountered particularly, if the copper collar is circular and without any markings to facilitate correct orientation or if the plaster surrounding the copper ring could be easily damaged whilst working on the modelling material.

The plaster impression, now containing the copper ring filled in with modelling material shaped to form the root-like extension, then has plaster cast on to it. After removal of the plaster impression and the copper ring a clear reproduction of the teeth and gums of the patient in cast plaster is obtained, the particular tooth on which a prosthesis is to be worked being apparent as a removable work model in the plaster work model of the jaw.

During the next step of the known process, the individual tooth prostheses, jacket crowns, half crowns, inlays and the like are fabricated on the work model of the stump. To do this, such work model has to be repeatedly removed from and re-inserted into the cast plaster model. This causes fine particles of plaster to be rubbed off and the seating of the stump model in the plaster model is liable to become inaccurate. Accordingly, the stump model may no longer assume its predetermined accurate position in the plaster model. The result is that the completed tooth prosthesis on the stump model assumes a different position in the mouth of the patient than that determined by the impression. It is an aim of the present invention to overcome these disadvantages.

The invention provides a device for use as a technical aid for preparing an individual tooth prosthesis, comprising a shell adapted to be mounted in a work model against rotation and a pin comprising a tail portion adapted to be removably inserted with a snug fit into the shell in such a manner that it is prevented from rotating relatively to the shell at a head portion on which a reproduction of a patient's tooth may be formed from a modelling material.

In a particularly convenient form of embodiment of the work model, in order to secure

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the pin against rotation about its longitudinal axis, the tail of the pin is constructed as a polygonal element, and the inner and outer profiles of the shell are also polygonal.

5 In order that an associated shell and pin cannot be confused, it is convenient to arrange for the shell and the pin tail to be in the form of a polygon irregular in cross-section.

10 In a further form of the device, in order to secure the shell and pin against rotation about their common longitudinal axis, the shell and the tail of the pin are provided one with an indentation and the other with a projection engageable with the indentation.

15 The device can also advantageously be so constructed that the tail tapers towards its free end.

It is particularly advantageous for working on the work model to shape the head of the pin in the form of the crown of a tooth on a reduced scale.

Finally, it is convenient to have a shell and pin standardized according to tooth size.

20 Examples of embodiments of the invention are illustrated diagrammatically in the accompanying drawings, wherein:

Fig. 1 is a front view, in section of a shell with a pin situated therein;

Fig. 2 is a side view of the shell and pin illustrated in Fig. 1;

Fig. 3 is a sectional view taken on the line A—B of Fig. 2, but on a larger scale;

Figs. 4—8 show various cross-sectional forms of the shell and the tail of the pin;

Fig. 9 is a view, partly in section and partly in elevation, of a plaster impression taken in the patient's mouth, with a copper collar or ring arranged in the impression and a pin and shell shown above the ring;

Fig. 10 shows the same elements as in Fig. 9, but in the assembled condition;

Fig. 11 is an elevational view of part of a jaw with teeth therein and a prepared tooth stump, and

Fig. 12 is a view partly in section and partly in elevation, of a large work model with shell and pin therein and with teeth.

Referring to the drawings, a pin 2 is adapted to be introduced with a snug fit into a shell 1.

The shell 1 is mounted in the large work model 3 (Fig. 12) which is adapted to be formed of plaster, during the production of the large model. The tail of the pin 2 is not quite seated into the shell 1 as shown in Fig. 12.

Owing to its outer configuration, e.g. owing to its polygonal cross-section, the shell 1 is prevented from rotating about its longitudinal axis when it is mounted in the large work model 3.

When the pin 2 is fully seated in the shell 1 it is similarly secured against rotation about its own longitudinal axis relatively to the shell, as will be apparent from the cross-sectional forms illustrated in Figs. 3—8.

The shell 1 and the pin 2 consist of a substance, preferably plastics material, to which the modelling material adheres.

The shell 1 and the tail of the pin are of irregular polygonal cross-section in the form illustrated in Figs. 3—6.

In the forms illustrated in Figs. 7 and 8, the shell 1 and the pin 2 are prevented from rotating about their common longitudinal axis by providing the shell 1 and the tail with interengaging indentations (Fig. 7) or with a projection engaging into an indentation (Fig. 8).

In the form of embodiment illustrated in Fig. 7, the indentation 4 in the shell 1 is inwardly directed and engages in the corresponding indentation 4¹, which is situated in the pin 2. The plaster mass 12 can penetrate from the exterior into the indentation 4 when the large work model 3 is formed, and in this way the shell 1 is prevented from rotating about its longitudinal axis in the finished work model 3.

In the form of embodiment illustrated in Fig. 8, the indentation 5 arranged in the shell 1 extends in the outward sense, and into the indentation 5 there engages a matching projection 5¹ which proceeds from the pin 2.

Referring to Fig. 9 of the drawings, a copper ring 7 is situated in a plaster impression 6 which is taken in the patient's mouth. This copper ring 7 is so filled with a special impression material 8 such as a suitable silicone or alginate base, that when the impression is made a cavity 9 in the material 8 which is a negative representation of the shape of the prepared tooth stump 10, is obtained such as is illustrated diagrammatically in Fig. 11.

The cavity 9 is then filled with a modelling material 11 as indicated in Fig. 9 by the dotted portion. This modelling material 11 comprises a substance which adheres to and forms a bond with the pin 2.

While the modelling compound 11 is still pliant and therefore still deformable, the head of the pin 2 is so pressed into the modelling material 11 (Fig. 9) that it takes up the position shown in Fig. 10. The portion of the modelling material 11 which runs over the upper edge of the copper ring is removed.

After the modelling material 11 hardens, a further plaster mass 12 is poured in a manner known *per se* into the plaster impression 6 containing the shell and pin 2. After this plaster mass 12 hardens, the plaster impression 6 with the copper ring 7 and impression material 8 situated therein are removed so as to leave free the plaster model shown in Fig. 12 for acting as a work model 3 with the shell 1 and pin 2 situated in the said model 3, the shape of the modelling material 11 adhering to the head of the pin 2 being a reproduction of the patient's tooth stump 10.

In the region of the pin 2, the plaster model 12 is so cut to form a recess 13 that the pin can be removed from the shell, the lower

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portion 14 and the crown portion 15 of the head of the pin being exposed.

The pin 2 can then alternately be withdrawn from the shell 1 and reinserted therein. When finishing the tooth prosthesis, this can be continued until the prosthesis prepared on the pin 2 has attained its desired final form and position relatively to the neighbouring teeth.

10 WHAT I CLAIM IS:—

1. A device for use as a technical aid for preparing an individual tooth prosthesis, comprising a shell adapted to be mounted in a work model against rotation and a pin comprising a tail portion adapted to be removably inserted with a snug fit into the shell in such a manner that it is prevented from rotating relatively to the shell and a head portion on which a preproduction of a patient's tooth may be formed from a modelling material.
2. A device according to Claim 1, wherein the pin and the shell are made of plastics material.
3. A device according to any preceding claim, wherein the pin is made of such a material that a synthetic resin modelling material will adhere to it.
4. A device according to any preceding

claim, wherein the tail portion of the pin and the inner and outer cross-sectional profiles of the shell are polygonal.

5. A device according to Claim 4, wherein the shell and the tail portion of the pin are in the form of an irregular polygon.

6. A device according to any one of Claims 1—3, wherein the shell and the tail of the pin are provided one with an indentation and the other with a projection engageable with the indentation.

7. A device according to any preceding claim, wherein the tail of the pin tapers towards its free end.

8. A device according to any preceding claim, wherein the pin head has the shape of the crown of a tooth on a reduced scale.

9. A device according to Claim 8, wherein the shell and the pin are standardized according to teeth sizes.

10. A device for use as a technical aid for preparing an individual tooth prosthesis, substantially as hereinbefore described with reference to the accompanying drawings.

D. YOUNG & CO.,
10, Staple Inn, London, W.C.1,
Agents for the Applicant.

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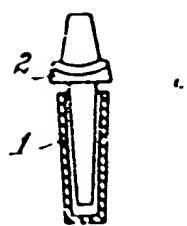
This drawing is a reproduction of
the Original on a reduced scale.

Fig. 1

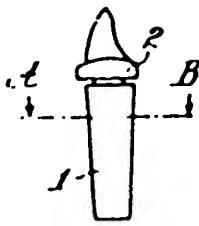


Fig. 2



Fig. 3



Fig. 4

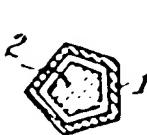


Fig. 5

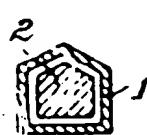


Fig. 6



Fig. 7

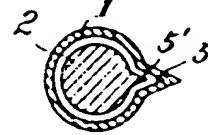


Fig. 8

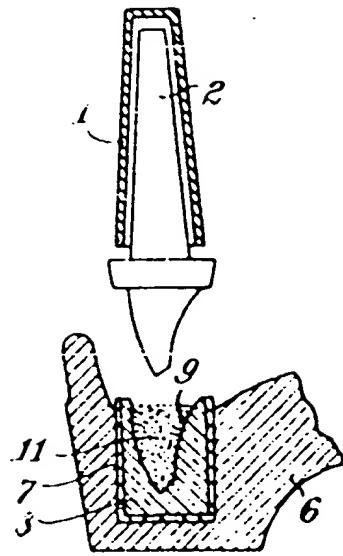


Fig. 9

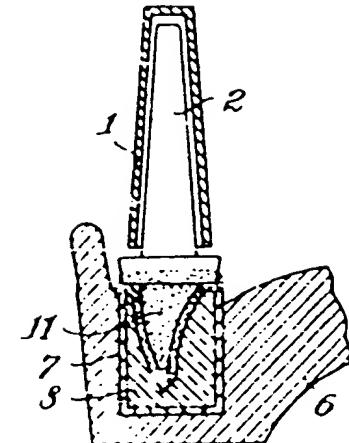


Fig. 10



Fig. 11

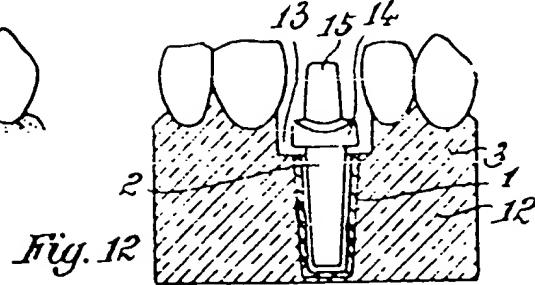


Fig. 12